# U. S. DEPARTMENT OF AGRICULTURE

## Office of Information

Picture Story No. 109 May 1958



# *Searching for the unknown . . . about* INSECTS

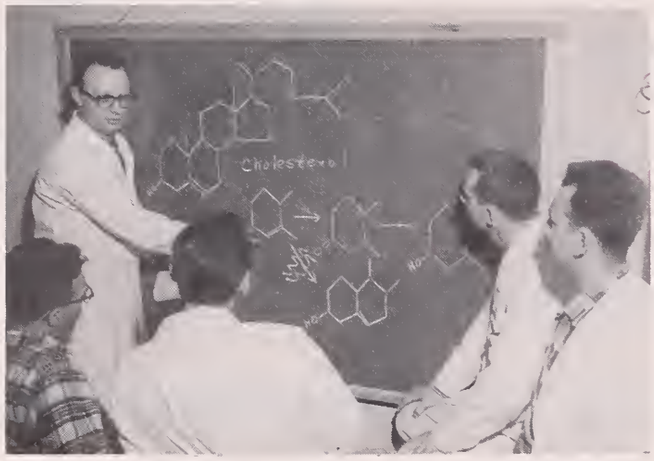
N-24351 -- To learn how the internal orgons of a house fly have been affected by an insecticide, entomologist Roy Barker dissects the insects under a binoculor microscope.

Learning more about the life processes of insects--how they breathe, grow, digest, reproduce--and how they are affected by insecticides, moisture, heat, cold, etc.--is the concern of a group of entomologists of the Agricultural Research Service's Pioneering Research Laboratory for Insect Physiology at Beltsville, Maryland.

This is one of the nine basic research units recently established by the U. S. Department of Agriculture. It is counted on to add to the fundamental knowledge needed as a base for finding answers to practical problems in the battle against insect pests that threaten man's health, food, and fiber.

Examples of some of the questions for which these entomologists are seeking answers are: How do insects develop resistance to insecticides? Can chemicals induce sterility in insects? Why do insects need cholesterol in their diet and what do they do with it?

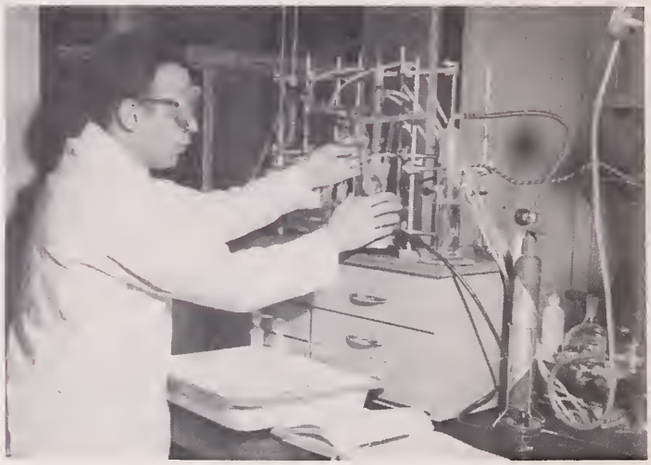
The photographs that follow show the researchers at work and show some of the laboratory techniques and equipment they use in their studies.




N-24347 -- Dr. William E. Robbins, chief entomologist of the Pioneering Research Laboratory for Insect Physiology, diagrams the molecular structure of cholesterol during a discussion period with his staff.

N-24335 -- Normal insects and insects resistont to insecticides ore raised in this room kept at constant temperoture ond humidity. William Dodson, laboratory aide, feeds pellets of dog food to a cockroach colony.

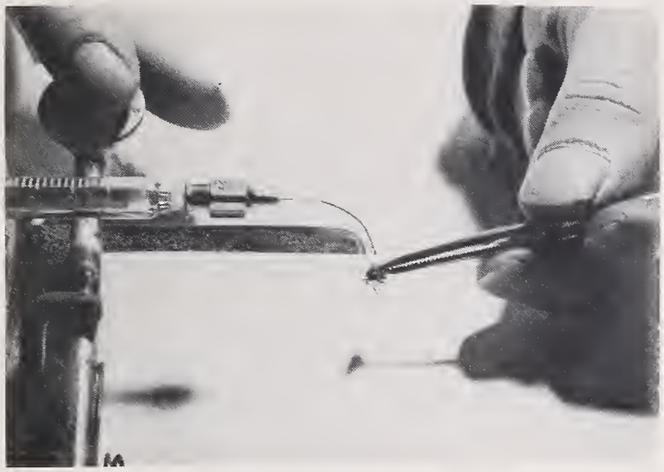
N-24334 -- Adult house flies raised for physiological ond biochemicol studies ore fed milk and sugar woter. A large syringe is used to deliver measured amounts of the food into poper cups inside the cage.



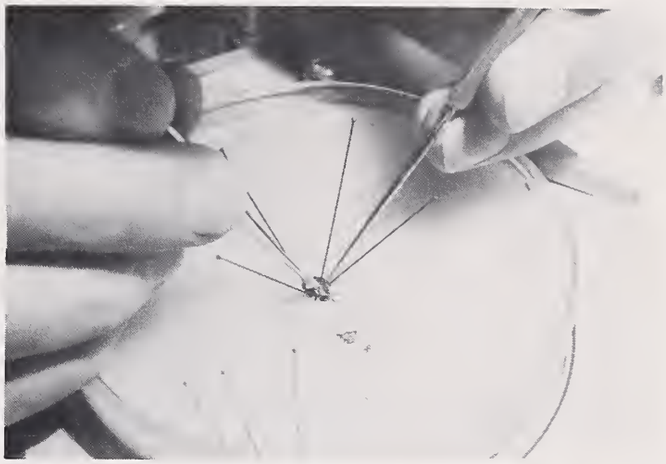
N-24337 -- Spiro J. Louloudes, entomologist, synthesizes a speciol type of chemicol to which o stable isotope colled deuterium is added. Both stable and radioactive isotopes are used to trace what happens to an insecticide in the insect.

N-24338 -- Flies to be treated for studies of resistonce to an insecticide are immobilized with corbon dioxide and placed in screened plastic cups by entomologist Ronald Monroe.

N-24339 -- The entomologist uses a micro-applicator to opply o measured drop of insecticide to each house fly. Normal house flies are compored in these studies with those resistant to the insecticide.

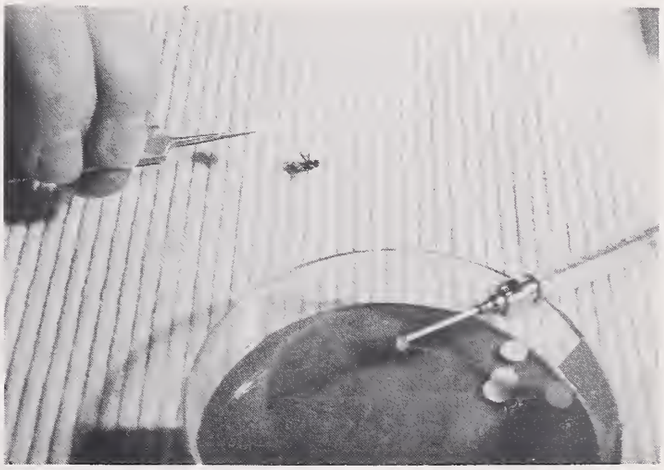


N-24340 -- The scientist presses lever to eject measured drop of insecticide. Counts and chemical analyses of the dosed flies are then made at varied intervals to determine mortality, and changes in chemical and physiological processes resulting in kill.



N-24352 -- Certain organs of the anesthetized fly are removed for further tests to compare physiological effect of chemical on flies resistant and those sensitive to the insecticide.

N-24341 -- Biologist Thomas J. Shortino fastens with adhesive tiny pieces of filter paper under treated house flies to collect excreta for analysis. This is one step in the process of studying the metabolism of compounds by insects.



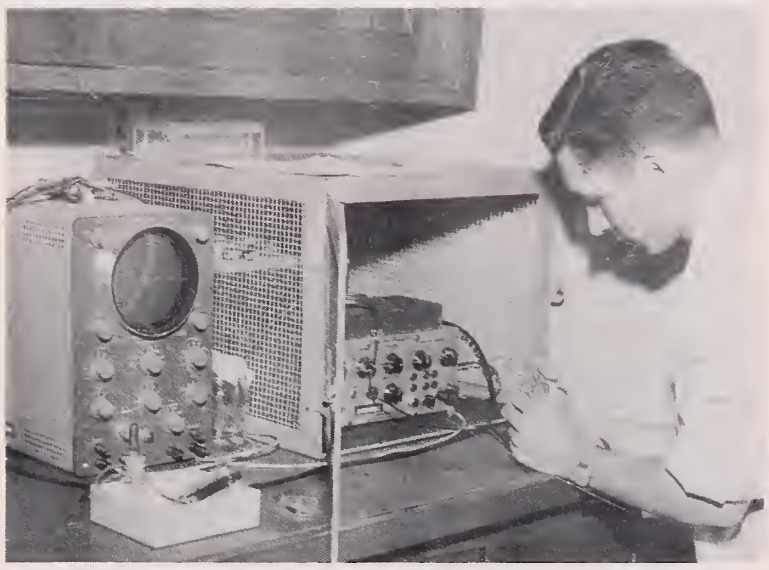
N-24342 -- (Close-up of N-24341)

N-24344 -- Norman Mitlin, entomologist, uses a spectrophotometer to make qualitative and quantitative analyses of materials produced in insects.

N-24343 -- John Kaplanis, entomologist, places a sample of a radioisotope-labeled compound in a Geiger-Muller counter to determine its specific activity. The heavy lead cylinder encasing the counter cuts out most of the natural radiation which the counter might pick up.

N-24349 -- Paper chromatographic technique is used to analyze chemicals in insect extracts and to help in analyses of metabolism of the chemicals by the flies. Here a solution of a compound to be analyzed is applied to a strip of chromatographic paper.

N-24346 -- William E. Robbins, chief entomologist, loads a refrigerated centrifuge with an insect extract. Working at lower temperatures is especially important when enzymes are involved.



N-24348 -- Measuring nerve impulses of a cockroach on an oscilloscope aids entomologist Roy J. Barker in his studies of the exact site of toxic effects. Insect organs can be used as tools to detect biologically active materials.

*Magazines and newspapers may obtain glossy prints of any of these photographs from the Photography Division, Office of Information, U. S. Department of Agriculture, Washington 25, D. C. Others may purchase prints, at 85¢ each, from the same address.*